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Claim

a scattered light detector provided in a direction substantially perpendicular to a direction where the laser beams are radiated, for detecting scattered light from the particles.

20. (New) A particle-measuring system,
provided in a processing system for generating an atmosphere including atmospheric air or a gas exhausted from within a processing chamber by a vacuum pump, and for processing an object relating to a semiconductor manufacturing in this atmosphere, and installed on an exhaust pipe that connects between an exhaust opening of the processing chamber and the vacuum pump, for measuring the number of particles included in the exhaust gas,
wherein processing chamber has a wall, the exhaust opening is made in a given part of the wall, the exhaust pipe extends horizontally, vertically or slantwise, and a trajectory of particles is simulated with respect to a direction in which air or gas is exhausted through the exhaust pipe.

REMARKS

Favorable reconsideration of this application as amended, and in light of the following discussion is respectfully requested.

In response to the Office Action comment on page 2 of the Office Action, requesting that Applicant inspect the specification to determine the presence of any possible minor errors, it is respectfully submitted that the amendments made to the specification included herewith correct for any minor errors that may have been present.

In response to the rejection of Claim 1 under 35 U.S.C. §112, second paragraph, as indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention, it is respectfully submitted that amended Claim 1 has

overcome this ground for rejection. Amended Claim 1 now recites a particle measuring system provided for irradiating laser beams onto a portion of exhaust gas having high particle density. Claim 1 further recites that this system detects scattered light from the particles in that portion of high density particle exhaust gas. Applicant therefore respectfully submits that Claim 1 clearly discloses what the invention comprises.

In response to the rejection of Claims 2-8 under 35 U.S.C. §112, second paragraph, as indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention, this ground for rejection is respectfully traversed. The Office Action states on page 2 that Claims 2-8 were rejected because they were dependent claims of a rejected base claim, Claim 1. The Office Action then states that Claims 2-8 were not further treated or examined on the merits. Applicant respectfully submits that Claims 2-8 were in a condition that did not preclude a substantive examination on the merits. Therefore, the Examiner had an obligation to examine Claims 2-8 on their merits.

Applicants acknowledge with appreciation the indication that Claims 9-17 contain allowable subject matter.

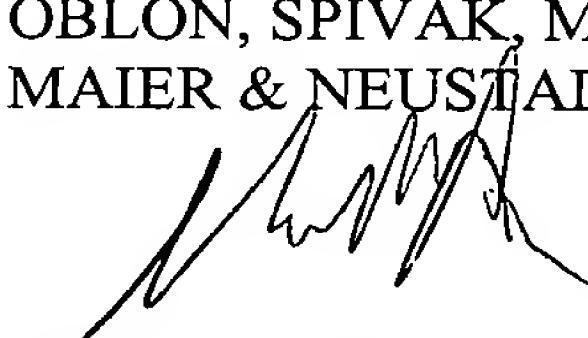
Claim 9 has been amended to overcome the rejection under 35 U.S.C. §112, second paragraph as indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicants regard as the invention. Amended Claim 9 now recites a parameter regarding a principle of generating particles and a parameter representing a feature of the generated particles. Claim 9 further recites counting the number of particles flowing into the exhaust pipe. Thus, Applicants have now identified the modeling parameters and have further eliminated any ambiguities with respect to the prior language on line 19 of Claim 9.

In response to the rejection of Claims 10-11 under 35 U.S.C. §112, second paragraph, as indefinite, Applicants respectfully traverse this ground for rejection. The Office Action states in paragraph 2 on page 3 that Claims 10-11 were rejected because they were dependent upon a rejected base claim, Claim 1. However Applicants note that as originally filed, Claims 10-11 depended from Claim 9. As the Office Action states no particular grounds for rejection for Claims 10-11 other than those of paragraph 2 on page 3 of the Office Action, it is respectfully submitted that these claims are in condition for allowance in their present form.

As the Office Action states on page 3 that Claims 9-11 would be allowable if the grounds for rejection under 35 U.S.C. §112, second paragraph were overcome, it is respectfully submitted that these claims are now in condition for immediate allowance. The subject matter as filed originally as Claim 17 has been incorporated into new Claim 20, and is therefore believed to be in condition for immediate allowance. An early and favorable action is therefore respectfully requested.

Respectfully submitted,

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IN THE SPECIFICATION

Please amend the specification as follows:

Please replace the paragraph beginning on page 5, line 20, with the following text:

--Further, the exhaust gas is swirled within the exhaust pipe near the discharge side of the vacuum pump 22. Therefore, the same particles cross the laser beams repeatedly, and they are counted [by] a plurality of times.--

Please replace the paragraph beginning on page 6, line 16, with the following text:

--The present invention provides a particle-measuring system mounted on a processing system that has a processing unit for carrying out a predetermined processing of an object to be processed and an exhaust system for exhausting an atmospheric gas from within a processing chamber of the processing unit by a vacuum pump. Within the processing system, the particle-measuring system is installed on an exhaust pipe that forms a part of the exhaust system communicating between an exhaust opening of the processing chamber and the vacuum pump. With this arrangement, the particle measuring system [measurers] measures the number of the particles included in the exhaust gas discharged from within the processing chamber.--

Please replace the paragraph beginning on page 17, line 23, with the following text:

--As a processing gas from a processing gas source (not shown), gases of WF₆ (a raw material gas), SiH₂Cl₂, Ar, etc. are supplied by a predetermined volume for each gas to the

shower head 72, and the gases are mixed together to form the processing gas. The processing gas is then supplied approximately uniformly to within the processing chamber 48 from the gas injection holes 78.--

Please replace the paragraph beginning on page 19, line 21, with the following text:

--The laser beams L may be [in] irradiated in any direction so long as the irradiated laser beams L are directed to the direction in which the center axis 92 of the chamber exists through the center point O of the cross section. However, a relative positional relationship with the scattered light detector 106 is maintained.--

Please replace the paragraph beginning on page 32, line 20, with the following text:

--In the above description, a film-forming system has been explained by taking a lamp-heating system as an example. However, the film-forming system is not limited to this. [It is needless to mention] It needs not be mentioned that the present invention can also be applied to a resistor-heating type film-forming system or a system using plasma. A film-forming system having a heating lamp, according to the invention has been described.--

IN THE CLAIMS

Please amend the claims as follows:

1. (Amended) A particle-measuring system,
provided in a processing system for generating an atmosphere including atmospheric air or a gas exhausted from within a processing chamber by a vacuum pump, and for processing an object relating to a semiconductor manufacturing in this atmosphere, and installed on an exhaust pipe that connects between an exhaust opening of the processing chamber and the vacuum pump,

the particle-measuring system being provided for radiating laser beams onto a portion of an exhaust gas, having a high particle density, exhausted from the exhaust pipe, detecting scattered light from particles in the portion of the exhaust gas and[, for] measuring the number of particles included in the exhaust gas.

9. (Amended) A particle-measuring method for measuring the number of particles included in an exhaust gas exhausted from a processing system for generating an atmosphere including atmospheric air or a gas exhausted from within a processing chamber by a vacuum pump, and for processing an object relating to a semiconductor manufacturing in this atmosphere, the method comprising the steps of:

modeling [parameters] a parameter regarding a principle of generating particles and a parameter representing a feature of the generated particles;

carrying out a numerical simulation for expressing trajectory of an exhaust gas that includes particles flowing through an exhaust pipe;

carrying out a trajectory numerical simulation of an exhaust gas and particles;

confirming an optimum position for measuring particles;

determining sensor installation position;

installing the sensor; and

[evaluating a measurement of particle] counting the number of particles flowing in the exhaust pipe,

wherein trajectory of particles that flow through the exhaust pipe after the particles have been generated inside the processing chamber and exhausted from the processing chamber are simulated, to select an area where the density of the particles is the highest in the radial direction of the exhaust pipe, a laser beam irradiator is disposed at a position in this area where laser beams for measurement pass through and a scattered light detector is

disposed in a direction orthogonal with the laser beams, thereby to measure the number of the particles.

18. (New)

19. (New)

20. (New)